New national and regional bryophyte records, 59

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2019-04-03

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Long , D G , Mamontov , Y S , Manjula , K M , Manju , C N , Mufeed , B , Müller , F , Nair , M
þÿ C , N o b i s , M , N o r h a z r i n a , N , A i s y a h , M , L e e , G E , P h i l i p p e , M ,
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New national and regional bryophyte records, 59

L. T. Ellis[a], L. A. Amélio[b], D. F. Peralta[b], M. Bačkor[c], E. Z. Baisheva[d], H. Bednarek-Ochyra[e], M. Burghardt[f], I. V. Czernyadjeva[g], S. S. Kholod[g], A. D. Potemkin [g], A. Erdağ[h], M. Kırmacı[h], V. E. Fedosov[i], M. S. Ignatov[i], D. E. Koltysheva[i], J. R. Flores[j], E. Fuertes[k], M. Goga[l,m], S.-L. Guo[n], W. K. Hofbauer[o], M. Kurzthaler[o], H. Kürschner[p], O. I. Kuznetsova[q], M. Lebouvier[r], D. G. Long[s], Yu. S. Mamontov[t], K. M. Manjula[u], C. N. Manju[u], B. Mufeed[u], F. Müller[v], M. C. Nair[w], M. Nobis[x], N. Norhazrina[y], M. Aisyah[y], G. E. Lee[y], M. Philippe[z], D. A. Philippov[aa], V. Plášek[ab], Z. Komínková[ab], R. D. Porley[ac], Yu. A. Rebriev[ad], M. S. Sabovljević[ae], A. M. de Souza[af], E. B. Valente[af], D. Spitale[ag], P. Srivastava[ah], V. Sahu[ah], A. K. Asthana[ah], S. Ştefănuţ[ai], G. M. Suárez[aj,ak], A. A. Vilnet[al], K.-Y. Yao[am] and J.-Ch. Zhao[an]

[a]The Natural History Museum, Cromwell Road, London, SW7 5BD, UK; [b]Instituto de Botânica, São Paulo, Brazil; [c]Department of Botany, Institute of Biology and Ecology, Pavol Jozef Šafárik University, Košice, Slovakia; [d]Ufa Institute of Biology, Subdivision of Ufa Federal Research Centre of Russian Academy of Sciences, Ufa, Russia; [e]W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków, Poland; [f]Carrera de Ingeniería Agroindustrial y Alimentos, Facultad de Ingeniería y Ciencias Agropecuarias, Universidad de Las Américas, Pichincha, Ecuador; [g]Komarov Botanical Institute of the Russian Academy of Sciences, St. Petersburg, Russia; [h]Aydın Adnan Menderes Üniversitesi, Kepez-Aydin, Turkey; [i]Lomonosov Moscow State University, Russia; [j]Finnish Museum of Natural History, University of Helsinki, Helsinki, Finland; [k]Departamento de Biodiversidad, Ecología y Evolución, Universidad Complutense, Madrid, España; [l]Institute of Biology and Ecology, Pavol Jozef Šafárik University, Košice, Slovakia; [m]Core Facility Cell Imaging and Ultrastructure Research, University of Vienna, Vienna, Austria; [n]East China Normal University, Shanghai, People's Republic of China; [o]Fraunhofer-Institut für Bauphysik IBP, Holzkirchen, Germany; [p]Freie Universität Berlin, Institut für Biologie, Systematische Botanik und Pflanzengeographie, Berlin, Germany; [q]Tsitsin Main Botanical Garden, Russian Academy of Sciences, Moscow, Russia; [r]CNRS UMR 6553, Université de Rennes 1, France; [s]Royal Botanic Garden Edinburgh, Edinburgh, UK; [t]Botanical Garden-Institute, Far Eastern Branch of Russian Academy of Sciences, Vladivostok, Russia; [u]PG & Research Department of Botany, The Zamorin's Guruvayurappan College, Kozhikode, Kerala, India; [v]Institut für Botanik, Technische Universität Dresden, Dresden, Deutschland; [w]PG & Research Department of Botany, Govt. Victoria College, Palakkad, Kerala, India; [x]Jagiellonian University, Kraków, Poland; [y]Faculty of Science and Technology, Universiti Kebangsaan Malaysia, Bangi, Selangor, Malaysia; [z]Université Lyon-1 et UMR CNRS 5023 'Ecologie des Hydrosystèmes Naturels et Anthropisés', Villeurbanne, France; [aa]Papanin Institute for Biology of Inland Waters, Russian Academy of Sciences, Borok, Yaroslavl Region, Russia; [ab]University of Ostrava, Ostrava, Czech Republic; [ac]Cera dos Pomares, Aljezur, Portugal; [ad]Southern Scientific Center of the Russian Academy of Sciences, Rostov-on-Don, Russia; [ae]Institute of Botany and Botanical Garden, Faculty of Biology, University of Belgrade, Belgrade, Serbia; [af]Departamento de Biologia, Universidade Estadual de Feira de Santana, Feira de Santana, BA—Brazil; [ag]MuSe Museo delle Scienze, Corso del Lavoro e della Scienza, Trento, Italy; [ah]Bryology Laboratory, CSIR–National Botanical Research Institute, Lucknow, India; [ai]Institute of Biology Bucharest of Romanian Academy, Bucharest, Romania; [aj]Unidad Ejecutora Lillo (UEL; FML-CONICET), Miguel Lillo 251, (4000) S.M. de Tucumán, Argentina; [ak]Facultad de Ciencias Naturales e Instituto Miguel Lillo, Universidad Nacional de Tucumán, Miguel Lillo 205, (4000) S.M. de Tucumán, Argentina; [al]Polar-Alpine Botanical Garden, Kola Science Centre, Russian Academy of Sciences, Murmansk Province, Russia; [am]Endemic Species Research Institute, Nantou, Taiwan; [an]Hebei Normal University, Shijiazhuang, People's Republic of China

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1. ***Aulacopilum glaucum*** Wilson

Contributors. P. Srivastava, V. Sahu and A. K. Asthana

India. Manipur, Imphal, Bishnupur, Leimaram, near Sadu Chiru Falls, 24°44′21.3″N, 093°44′56.3″E, epiphytic, 1111 m a.s.l., 28 July 2018, *leg.* P. Srivastava (LWG 307248C).

Aulacopilum glaucum, in the family Erpodiaceae, has recently been identified from Manipur in north-east India, and is new to the Eastern Himalayas. It was earlier reported from the Western Ghats (Daniels et al. 2012), Eastern Ghats (Asthana and Srivastava 2016) and the Western Himalayas (Sahu and Asthana 2016). In India there are 4 species of *Aulacopilum* Wilson (Lal 2005; Daniels et al. 2012). *Aulacopilum glaucum* can be easily recognised by the presence of dimorphic leaves; broad dorsal leaves and narrow ventral leaves with numerous rhizoids. The plants were bright green, with an irregularly branched, creeping stem, 12–15 mm long. Leaves were in four rows (2 dorsal and 2 ventral), closely imbricate, complanate, ecostate and papillose with crenulate margins. The dorsal leaves were ovate-lanceolate, 0.64 × 0.32 mm, whilst the ventral leaves were narrowly lanceolate, 0.48 × 0.16 mm.

2. ***Brachythecium japygum*** (Głow.) Köckinger & Jan Kučera

Contributor. M. Philippe

France. Bourgogne-Franche-Comté: Jura department, Les Rousses, 46°31′29.23″N, 6°4′53.11″E, 1225 m. a.s.l., small mats in the sheltered cracks of a lapiaz (limestone pavement, Upper Jurassic) in a subalpine *Picea* L. forest,

CONTACT L.T. Ellis l.ellis@nhm.ac.uk

21 August 2013, *leg*. M. Philippe *s.n.* (LY22963). Auvergne-Rhône-Alpes: Ain department, Thoiry, 46° 16′13.55″N, 5°56′26.06″E, 1680 m. a.s.l., moderately thick mats in the crevices of the north-facing cliff of a canyon, 27 July 2012, *leg*. M. Philippe *s.n.* (LY22964); Ain department, Bellegarde-sur-Valserine, 46° 8′11.42″N, 5°51′58.93″E, 1545 m. a.s.l., small mats in a sheltered crevice of a limestone cliff (Upper Jurassic) within a *Picea* forest, 11 September 2011, *leg*. M. Philippe *s.n.* (LY22965); Haute-Savoie department, Thollon-les-Mémises, 46°22′29.4″N, 6°45′38.81″E, 1655 m. a.s.l., moderately dense mats in cracks of a north-facing limestone cliff (Middle Jurassic), 3 July 2017, *leg*. M. Philippe *s.n.* (LY22966); Isère department, Saint-Christophe-sur-Guiers, 45°23′30.34″N, 5° 48′44.39″E, 1575 m. a.s.l., small mats in a N-facing crevice of a limestone block (Senonian, Upper Cretaceous) in a *Picea* forest, 28 September 2014, *leg*. M. Philippe *s.n.* (LY22967). Provence-Alpes-Côte-d'Azur: Alpes-de-Haute-Provence department, Saint-Paul-sur-Ubaye, 45°23′32.67″N, 5°49′18.31″E, 1650 m. a.s.l., small mats in sheltered cracks of a serpentine cliff, 7 July 2018, *leg*. M. Philippe *s.n.* (LY22968).

All of these collections, previously identified as *Brachythecium cirrosum* (Schwägr.) Schimp., were revised using the treatment by Köckinger and Kučera (2016) and they all fit well with the diagnostic features used in their key. Köckinger and Kučera (2016) mentioned the occurrence of *B. japygum* in France, but only for the Doubs (Bourgogne-Franche-Comté region) and Haute-Savoie (Auvergne-Rhône-Alpes region) departments. Our new data indicate that the species is widely distributed along the Jura and French Alps system, in the subalpine belt, within sheltered cracks and crevices, in limestone and serpentine.

3. ***Brachythecium rutabulum*** (Hedw.) Schimp. var. ***atlanticum*** Hedenäs

Contributor. R. D. Porley

Portugal. Algarve: NW of Barranco dos Pisões, Serra de Monchique, 318 m a.s.l., 37°20′34.70″N, 8°34′13.32″W, in barranco on inclined N-facing hard schist rock slab on thin layer of soil, with sporophytes, 17 May 2016, *leg*. R. D. Porley, *det*. L. Hedenäs (Hb. Porley).

Brachythecium rutabulum var. *atlanticum* is typically slightly larger and more turgid than var. *rutabulum*, with densely inserted broad stem leaves, which are quite strongly plicate (Hedenäs 1992). Normally these characters enable good field recognition, but poorly developed specimens are difficult to separate. Under the microscope the alar cells are also distinctly differentiated, forming larger groups than in var. *rutabulum*.

Brachythecium rutabulum var. *atlanticum* seems to be widespread on Serra de Monchique, to-date with 14 collections between 185–803 m a.s.l. It is often associated with some disturbance, in humid barrancos, on banks and paths, on soil and rock, and around the entrance to water-mines. It also occurs on the bases of large *Castanea sativa* Mill. on N-facing damp slopes, and between massive syenite blocks on N-facing aspects. Associated species include *Calypogeia fissa* (L.) Raddi, *Claopodium whippleanum* (Sull.) Renauld & Cardot, *Diplophyllum albicans* (L.) Dumort., *Hypnum cupressiforme* Hedw., *Kindbergia praelonga* (Hedw.) Ochyra, and *Phaeoceros laevis* (L.) Prosk. Sporophytes are frequent. The type variety has not been decisively collected in the study area.

Brachythecium rutabulum var. *atlanticum* was, until now, only known as a Macaronesian taxon from Madeira and the Azores, and is here reported for the first time from mainland Portugal. Its occurrence on Serra de Monchique, a massif in the extreme SW of Europe and close to the Atlantic Ocean, highlights the possible connection with the Macaronesian bryoflora.

4. ***Bryum alpinum*** With.

Contributor. H. Bednarek-Ochyra

Ethiopia. Bale Province, Bale Mountains, Wasama, 6°55′N, 39°46′E, 3900 m a.s.l., rock wall, 90° S-facing, tussock grass and Crassulaceae community in wind shelter, moss cushions on rock ledges, 5 January 1990, *leg*. Georg and Sabine Miehe *445* (KRAM).

Although *Bryum alpinum* is sometimes considered to be a cosmopolitan moss (Dierßen 2001), it is actually absent from tropical Asia, Oceania, Australasia and Antarctica. It is a panholarctic boreal-temperate species, occasionally penetrating into the sub-Arctic and Arctic in Alaska, Greenland, Scandinavia, Kola Peninsula and Chukotka. It has a strongly dissected geographical range, with maximum occurrence in Europe where it extends from the Faeroes and southern Scandinavia to the Caucasus and the Mediterranean, including North Africa and Macaronesia. In Asia and North America the species is widely distributed but scattered, mainly in the temperate zone. As is the case with many northern montane moss species, *B. alpinum* often occurs in highly isolated outposts in tropical mountains. In the Americas it occurs infrequently in Mexico and South America, where it extends in the Andes from Venezuela and Colombia to Bolivia and northern Argentina at elevations of 1550–3700 m (Ochi 1980; Churchill et al. 2000). The record of this species from southern Chile (Blockeel, Abay et al. 2008) is based upon the misidentification of the specimen which correctly represents *B. australe* Hampe. In sub-Saharan Africa *B. alpinum* is widely distributed and locally abundant in East and Central Africa, ranging from Kenya and Uganda to South Africa and Namibia and, occasionally, it also occurs in Bioko and Cameroon in West Africa (O'Shea 2006). The species had also been recorded from the Bale Mountains in south-eastern Ethiopia (Miehe and Miehe 1994) but because no details of this record have been provided, the relevant voucher collection is cited here. *Bryum alpinum* is a notable

addition to the moss flora of Ethiopia, which is still bryologically underinvestigated. O'Shea (1997) reported 247 species of moss from this country, but recent publications (e.g. Koponen 1993; Blockeel, Matcham, et al. 2001; Wigginton 2001; Ochyra and Bednarek-Ochyra 2002; Blockeel, Bednarek-Ochyra. et al. 2004; Ellis, Aeffi, Tacchi, et al. 2014; Ellis, Asthana, et al. 2016) yielded a number significant additions.

5. ***Bucklandiella didyma*** (Mont.) Bedn.-Ochyra & Ochyra

Contributor. H. Bednarek-Ochyra

Antarctica, South Shetland Islands. Deception Island: (1) geothermal area on slopes to east and south-east of Pendulum Cove, 50–100 m a.s.l., November 1987 – January 1988, *leg*. L. Greenfield *6924* (AAS, KRAM); (2) southern Pendulum Cove, flat area just below the ice, 100 m a.s.l., 8 March 1987, *leg*. R. I. Lewis Smith *5749C* (AAS, KRAM); (3) summit of peak 2.2 km WNW of Mount Kirkwood summit, 350 m a.s.l., February 1994, *leg*. D. Mason *125* (AAS, KRAM).

Bucklandiella didyma is panholantarctic temperate species having optimum occurrence in southern South America. It has a continuous geographical range in the *Nothofagus* Blume zone on the western fringes of the continent, extending from central Chile to Tierra del Fuego (Deguchi 1984), with some isolated stations in the Archipelago Juan Fernández, in Santa Catarina Province in SE Brazil (Bednarek-Ochyra et al. 1999), the Falkland Islands (Ochyra, Crabtree, et al. 2015) and on subantarctic South Georgia (Ellis, Agcagil, et al. 2016). Outside South America, it has been reported from South Africa (Ochyra, Lewis Smith, et al. 2008), Tasmania and New Zealand (Blockeel, Bednarek-Ochyra et al. 2008; Blockeel, Bednarek-Ochyra et al. 2010). Additionally, *B. didyma* penetrates to the northern maritime Antarctic (Ochyra, Lewis Smith, et al. 2008) where it is known from several sites on Bellingshausen Island in the South Sandwich archipelago. Herein, three records of the species are provided from the volcanic Deception Island in the South Shetland Islands where scanty material was collected on heated ground in the geothermal areas. *Bucklandiella* Roiv. is a prominent genus in the bryoflora of Antarctica, but only in terms of the number of species. So far, five have been recorded (Ochyra, Lewis Smith, et al. 2008; Ochyra, Bednarek-Ochyra, et al. 2008; Bednarek-Ochyra and Ochyra 2013; Ellis, Ah-Peng, et al., 2017). Except for *B. sudetica* (Funck) Bedn.-Ochyra & Ochyra, all remaining species occur only on the volcanic islands in the South Sandwich Islands and South Shetland Islands archipelagoes. As their populations are very small, it is very likely they are recent immigrants that reached the Antarctic via long distance dispersal of propagules after the Last Glacial Maximum (LGM) (Birkenmajer et al. 1985) as is the case with the colonisation of other subantarctic islands by bryophytes in the post-LGM period (Van der Putten et al. 2004, 2009).

6. ***Bucklandiella joseph-hookeri*** (Frisvoll) Bedn.-Ochyra & Ochyra

Contributors. H. Bednarek-Ochyra, D. G. Long and F. Müller

Myanmar. (1) Kachin State, Putao District, Hponyin Razi, slope with south-eastern exposure and 28° gradient, 3860 m a.s.l., 27°39′30.4″N, 96°58′11.5″E, lower upland alpine bamboo thicket, associated with *Bucklandiella verrucosa* (Frisvoll) Bedn.-Ochyra & Ochyra var. *emodense* (Frisvoll) Bedn.-Ochyra & Ochyra, 17 October 2013, *leg*. G. Miehe, P. K. Kine, L. Shein, M. Kyaw, P. Ma & S. Lan Wan *13-056-023-JJ* (DR, KRAM); (2) Kachin State, Putao District, W slope of the Gaoligong Shan (Irrawady catchment), Burma/Yunnan border ridge at border marker 31, south of 'Yaping Pass', ca. 3710 m a.s.l., 27°12′15.4″N, 98°41′39.9″E, exposed rocky W-facing alpine ridge slope, with granite boulders and dwarf rhododendrons; on top of boulder, *leg. & det*. D. G. Long *34858*, *verif*. H. Bednarek-Ochyra (E, KRAM).

Bucklandiella joseph-hookeri is one of the rarest species of *Bucklandiella* Roiv. occurring at altimontane elevations in the Sino-Himalayan region (Frisvoll 1988; Cao et al. 2003). Although it was first collected in November 1848 in Nepal by Joseph D. Hooker (Hooker 1854), the voucher specimens were determined by W. Wilson as *Racomitrium heterostichum* (Hedw.) Brid. and *R. microcarpon* (Hedw.) Brid. (Mitten and Wilson 1857). The former does not occur in Asia at all (Frisvoll 1988; Bednarek-Ochyra 1995), whilst the latter is widely scattered in the northern regions of the continent in Russia (Ignatova 2017a) and does not penetrate south of 35°N. The specimens collected by J.D. Hooker (all sterile) were described by Frisvoll (1988) as a new species, *R. joseph-hookeri* Frisvoll.

Hitherto, *B. joseph-hookeri* has been recorded from East Nepal, Bhutan (Frisvoll 1988) and China (Xizang, Sichuan and Yunnan) (Cao et al. 2003), where it occurs at high elevations, ranging from 3300 to 4650 m a.s.l. This species is now recorded from the northernmost part of Myanmar. It was already mentioned from this country by Long (2008) but without citation of a voucher specimen, and with only very generalised locality data. Herein, this literature record is substantiated by the citation of the corresponding specimen and, additionally, a further specimen is cited. The first of the aforementioned specimens is from the west side of Putao District close to SE Tibet and this is apparently the extreme east end of the Himalaya. The second specimen has been recorded in the Gaoligong Shan, one of many component mountain ranges of the Hengduan Shan mountain system that

connects the SE portions of the Tibetan Plateau with the Yunnan-Ghuizou Plateau.

7. ***Bucklandiella pachydictyon*** (Cardot) Bedn.-Ochyra & Ochyra

Contributors. M. Bačkor, M. S. Sabovljević and M. Goga **Antarctica, James Ross Island**. rocky wet ground, 63° 48.4476′S, 57°50.7135′W, 31 January 2017, *leg*. Bačkor M. *s.n*., *det*. M. S. Sabovljević and M. Goga (BEOU and Košice University bryophyte collections *s.n*).

The senior contributor recently made a collection of bryophytes on James Ross Island (Antarctica) (Ochyra, Lewis-Smith, et al. 2008; Ochyra, Bednarek-Ochyra, et al. 2008), where until recently only 37 species and two varieties of moss were known to occur. Goga et al. (2018) recorded two additional species found among collections made in 2017 by Martin Bačkor, namely *Bryum dichotomum* Hedw. and *Bryum pallescens* Schwägr. Additionally, the present contributors, in Ellis, Afonina, Aleffi, et al. (2018), reported *Brachythecium subpilosum* (Hook.f. & Wilson) A.Jaeger from James Ross for the first time. This made a total of 40 moss species in the region.

A southern temperate element with amphiatlantic distribution, *Bucklandiella pachydictyon* is not considered a solely subantarctic species as its northward extension from the subantarctic is not restricted to high elevations. The species is widely distributed, but scattered in the Fuegian region and western Patagonia, extending northwards to 39°S in the *Nothofagus* zone in southern South America; it occurs on the subantarctic islands of South Georgia, Marion Island (Prince Edward Islands) and Possession in the Crozet archipelago, Îles Kerguelen and southwards into the maritime Antarctic. Churchill et al. (2000), recorded this species at high elevation in the Central Bolivian Andes, which Ochyra, Lewis Smith, et al. (2008) considered an isolated population. In Antarctica, it is known from the volcanic Deception Island (South Shetland Islands) and from Nelson Island (Ochyra, Lewis Smith, et al. 2008).

Bucklandiella pachydictyon, a new record for James Ross Island, raises the number of moss species recorded there to 41.

8. ***Chrysoblastella chilensis*** (Mont.) Reimers

Contributors. H. Bednarek-Ochyra and M. Lebouvier **Îles Crozet, Île de la Possession.** Eastern coast, Pointe Lieutard, rock outcrops 150 m north of Alfred Faure base by road to Crique du Navire, 46°25′43″S, 51°51′14″E, 100 m a.s.l., on patches of dry bare soil between boulders in the fernbrake, associated with *Dicranella campylophylla* (Taylor) A.Jaeger, 22 November 2012, *leg*. R. Ochyra *3148/12* (with M. Lebouvier) (KRAM).

Discovery of the circumholantarctic *Chrysoblastella chilensis* in Îles Crozet was predictable, since there are no phytogeographical or other reasons which could preclude its occurrence there. This austral cool-adapted temperate species is widely distributed on the Southern Ocean islands and it occurs in the coterminous archipelagoes of the Prince Edward Islands (Van Zanten 1971) and Îles Kerguelen (Ellis, Bednarek-Ochyra, Cykowska, et al. 2012) in the Kerguelen Biogeographical Province of the Subantarctic. For a long time Îles Crozet were the least studied archipelago in the Subantarctic and until the early 1970s only about 40 species of moss were known from this group of islands. Thanks to the present discovery and many earlier additions made in the last two decades (e.g. Blockeel, Chlebicki, et al. 2006; Ellis, Bednarek-Ochyra, Ochyra, Cykowska et al. 2012; Ellis, Bednarek-Ochyra, Ochyra, Benjumea, et al. 2013; Ellis, Bakalin, et al. 2013; Ellis, Alegro, et al. 2015; Ochyra, Sollman, et al. 2015; Ellis, Alataş, et al. 2017), as well as resolving the taxonomic status of some subantarctic species (e.g. Ochyra and Lewis Smith 1998; Ochyra and Bednarek-Ochyra 2013; Bednarek-Ochyra 2014), the moss flora of the archipelago had been increased to about 75 species. This diversity is still lower than that in the adjacent Prince Edward Islands and Îles Kerguelen, where, respectively, about 100 and 135 species have been detected.

9. ***Cinclidium stygium*** Sw.

Contributor. M. Philippe

France. Provence-Alpes-Côte-d'Azur: Alpes-de-Haute-Provence department, Saint-Paul-sur-Ubaye, 44° 36′14.28″N 6°52′28.89″E, 2053 m a.s.l., spring-fed mire, 7 July 2018, *leg*. M. Philippe *s.n.* (LY22969).

The species is new for the department, and is now rare in Europe (Blockeel 2018). It was found in a base-rich fen, associated with *Calliergon giganteum* (Schimp.) Kindb., *Drepanocladus aduncus* (Hedw.) Warnst., *Palustriella commutata* (Hedw.) Ochyra, *Ptychostomum pseudotriquetrum* (Hedw.) J.R.Spence & H.P.Ramsay ex Holyoak & N.Pedersen and *Scorpidium cossonii* (Schimp.) Hedenäs. This boreal-montane species was quite unexpected so far south, in an area of the inner Alps known for its dry climate. However, other glacial relics occur nearby, such as *Hierochloe odorata* (L.) P.Beauv. The associated bryoflora is floristically somewhat different to the one described for the newly discovered population of the species in Greece (Blockeel 2018), including more calcium demanding species, but physiognomically similar.

10. ***Dendroceros crispatus*** (Hook.) Nees

Contributors. L. A. Amélio, D. F. Peralta, A. M. de Souza and E. B. Valente

Brazil. Paraná state: estrada para a Graciosa, entre Morretes e Paranaguá, 27 September 1993, *leg*. O. Yano et al. *20593, 20596, 20659* (SP), 27 November 1994, *leg*. O. Yano et al. *23160* (SP), 18 November 2012, *leg*. A. Schäfer Verwimp *22920* (SP), 18 November 2012, *leg*. D.F. Peralta et al. *12953* (SP). Rio de Janeiro state: Nova Friburgo, estrada para Lµmiar, 22 July 1996, *leg*. O. Yano & S. R. Gradstein *24750* (SP). Santa Catarina

state: Urubici, Parque Nacional de São Joaquim, 10 March 2009, *leg*. D. F. Peralta & M. A. Barros *7715* (SP). São Paulo state: Cunha, Parque Estadual da Serra do Mar, 22 June 2006, *leg*. D. F. Peralta et al. *3956* (SP); São Luís do Paraitinga, Parque Estadual da Serra do Mar, Núcleo Santa Virgínia, Trilha do Pau de Bala, Mata Atlântica, sobre tronco vivo, 23°19′58′′S, 45°08′27′′W, 920 m a.s.l., 5 September 2009, *leg*. D. F. Peralta et al. *8840* (SP); Serra da Paranapiacaba, 30 April 1989, *leg*. A. Schäfer Verwimp & I. Verwimp *11118* (SP).

While revising the Anthocerotophyta specimens in Brazilian herbaria we found this important new country record that matches exactly with the description of Garcia et al. (2012). *Dendroceros crispatus* has the distinctive character of capsule cells with large trigones and intercalar thickenings. This feature is found in four other species: *D. africanus* Steph. which differs in the number of spore cells (to ten), and the smaller size of the spores reaching to 65.5–87.5 × 45–62.5 µm (Infante 2010); *D. borbonicus* Steph. which differs by the small cells of the capsule that reach 25–50 × 15.5–25 µm (Hasegawa 1981); *D. japonicus* Steph. which differs in having an undulate lamina (Hasegawa 1980), and *D. granulatus* Mitt. which differs in the large number of small cells (more than 20) in the spore, and also its undulate margins (Hasegawa 1982). These taxa seem to show a continuum of morphological characters and in accordance with Garcia et al. (2012), we emphasise the need for phylogenetic studies to understand the relationships among these taxa with nodulose epidermal cells.

The present records are the first for Brazil and southeastern tropical America. *Dendroceros crispatus* seems to be common in Central America, where it is reported from Panamá (Dauphin et al. 2006), Costa Rica and Guadeloupe Island (Pagán 1942), and it has also been found in Peru (Menzel 1984). Outside America it was reported for Australia (Cargill et al. 2005) and western Africa (Garcia et al. 2012).

11. ***Dicranolejeunea axillaris*** (Nees & Mont.) Schiffn.
Contributor. E. Fuertes
Argentina. Jujuy Province: Departamento Ledesma, Parque Nacional de Calilegua, paraje El Tigre, epífita en forófitos de la selva montana de *Myrtaceaea* - las yungas, 1550–170 [1700] m a.s.l., 23°44′S, 64°55′W, 14 June 2008, *leg*. E. Fuertes & C. Prada, *det*. E. Fuertes (MACB 111400, BM)

The Calilegua National Park is included in the biogeographic province Yunqueña, in north-western Argentina. This province is part of the Amazonic Domain, of the Neotropical Region (Cabrera and Willink 1980). The specimen was collected in the Yungas montane subtropical forests in the Jujuy province, where the altitude generally ranges between 600–2000 m. This site has a wet and humid climate in large part due to the northern trade winds, whose influence often results in excess of 2500 mm annual precipitation. The Yungas consists of dense cloud forests with verdant ferns and climbing lianas. The most representative species in this habitat include *Alnus acuminata* Kunth (aliso del cerro), *Cedrella angustifolia* Sessé & Moc. ex DC. (cedro salteño), *Cinnamomum porphyrium* (Griseb.) Kosterm (laurel de falda), *Juglans australis* Griseb. (nogal criollo) and tree ferns like *Cyathea odonelliana* Alston and *Nephelea incana* (Karst.) Gastony and other plants (Brown et al. 2001).

The specimen was a medium-sized epiphyte with creeping or pendulous shoots, 3–7(–10) cm long, forming a dark green to brown turf, and lacking sporophytes. Illustrations of *Dicranolejeunea axillaris* are provided by Kruijt (1988, p. 46, Plate 3; 50, Plate 4; 52, Plate 5), who records the species from México, Guatemala, El Salvador, Costa Rica, Panamá, Jamaica, Guadalupe, Martinica, Colombia, Venezuela, Ecuador, Peru, Bolivia and Chile. This contribution is a new record for the bryoflora of Argentina.

12. ***Dicranum canariense*** Hampe ex Müll.Hal.
Contributor. R. D. Porley
Portugal. Algarve, Fóia, Penedo do Buraco, Serra de Monchique, 750 m a.s.l., 37°19′22.38′′N, 8°35′21.67′′W, on rotten wood on floor of *Castanea sativa* Mill. woodland on N-facing slope, with *Hypnum cupressiforme* Hedw., 5 February 2015, *leg*. Porley, *conf*. L. Hedenäs (Hb. Porley).

Morhologically *Dicranum canariense* is similar to *D. scottianum* Turner, and under current concepts it differs by its much stronger denticulate leaf margins and costa, and in TS costa strongly convex dorsally with 2–4 ventral and 3–5 dorsal layers of stereids (Hedenäs and Bisang 2004).

On Serra de Monchique *D. canariense* is rare, found once on a fallen, rotten branch (probably *C. sativa*) on the north side of Fóia summit (902 m) and is thus in a sheltered and relatively humid location. Sporophytes were not seen. *Dicranum canariense* is known from Macaronesia (Azores, Madeira, Canary Islands), with old records from Spain (where it is considered Regionally Extinct) and old dubious reports from France.

Dicranum canariense is genetically closely related to *D. scottianum*. Lang et al. (2015) resolved them as sister clades and indicating they should both be distinguished at subspecies level, but with the caveat that further sampling is needed to confirm this. However, more recent unpublished work has further raised uncertainty regarding its status (*pers. comm*. Alain Vanderpoorten). Both taxa are Macaronesian—Atlantic species, and although *D. scottianum* occurs in Spain it is not reported for Portugal.

13. ***Ectropothecium ptychofolium*** N.Nishim.
Contributors. N. Norhazrina, M. Aisyah and G. E. Lee,
Peninsular Malaysia: Pahang, Cameron Highlands, Gunung Brinchang, 4°31′44.4′′N, 101°21′54′′E, on soil,

1760 m a.s.l., 23 November 1990, *leg*. A. Damanhuri *90-243* (UKMB).

Ectropothecium ptychofolium was first reported by Brotherus (1928) from Sarawak and West Borneo (as *Ptychophyllum borneense* Broth.). Reports of the species by Brotherus (1928), Herzog (1928), Dixon (1935) and Touw (1978) indicated that *E. ptychofolium* was widely distributed within, and endemic to, Borneo (Nishimura 1984). Further Bornean records were found in Sabah (Suleiman and Edwards 2002; Suleiman et al. 2011, 2017). However, Tan et al. (2000) and Tan and Shevock (2014) reported its presence outside Borneo, in Mindanao Island in the Philippines.

Nishimura (1984) considered a resemblance between *E. ptychofolium* and *E. penzigianum* M.Fleisch. owing to the similar form of their alar cells and leaf shape. However, *E. penzigianum* can be recognised by its patent, distinctly plicate leaves with a more elongated acumen.

14. ***Entodontopsis nitens*** (Mitt.) W.R.Buck & Ireland
Contributors. P. Srivastava, V. Sahu and A. K. Asthana
India. Manipur, Imphal, Bishnupur, Leimaram, near Sadu Chiru Falls, 24°44′21.3″N, 093°44′56.3″E, 1111 m a.s.l., epiphytic, 28 July 2018, *leg*. Priyanshu Srivastava *s.n.* (LWG 307248B).

Entodontopsis nitens has recently been identified from Manipur in north-eastern India and is new to the Eastern Himalayas. The plants were bright green, with prostrate, irregularly branched shoots, and complanate, imbricate leaves appressed to stem when dry. Lateral leaves were asymmetrical, spreading, oblong with an obtuse apex, 1–1.2 mm long. The leaf margins were entire or minutely serrate, and the costa occupied 1/2 or 2/3rd of the leaf length. Sporophytes were present, with an erect, reddish-brown seta, 10–14 mm long. Capsules were inclined, ovate-cylindrical with a double peristome, and a conical, long, rostrate operulum. Spores were green, rounded, 20–24 µm diameter.

15. ***Fissidens brevinervis*** Broth.
Contributors. K. M. Manjula, C. N. Manju and M. C. Nair
India. Western Himalayas, Uttarakhand, Dehradun district, Rishikesh, 370 m a.s.l., 06 October 2018, *leg.* Maya C. Nair *s.n.* (ZGC13171).

Fissidens brevinervis occurs in China and Indonesia, and in India is known only from Karnataka. This is a very rare species and the present collection is a new record for north-eastern India.

The plants were yellowish-green, 6–8 mm long, with 9–13 pairs of leaves. A central strand was absent or very weakly developed in the stem. The leaves lacked a limbidium, had a finely serrulate margin, and the costa, with a cortex of lamina-like cells, ended five or six cells below the leaf apex. The vaginant lamina occupied 2/3 of the leaf length and was closed or slightly open at its apex, while the dorsal lamina was wedge-shaped at the base and not decurrent. Leaf cells carried two or three papillae. Fertile plants were not observed.

16. ***Fissidens crassipes*** Wilson ex Bruch & Schimp.
Contributor. D. Spitale
Cyprus. Limassol District, Agios Pavlos village (Greek: Άγιος Παύλος), Germasogeia catchment, 4 km east of Kalo Chorio, Ayios Pavlos river, upstream of Kalimera diversion, 34°51′19″N, 33°02′47″E, 586 m a.s.l., 15 April 2018, *leg*. & *det*. Daniel Spitale *s.n*. (TR), *conf*. Peter Erzberger.

The species was found immersed in water together with *Didymodon tophaceus* (Brid.) Lisa, *Eucladium verticillatum* (With.) Bruch & Schimp., *Leptodictyum riparium* (Hedw.) Warnst. and *Platyhypnidium riparioides* (Hedw.) Dixon. *Fissidens crassipes* is characterised by (1) mostly robust plants 5–30 mm long, (2) a strong, often bulging limbidium that ceases well below the apex and is often intralaminar in the sheathing part, (3) relatively large laminal cells (10–)12–18(–20) µm long and 6–12 µm wide, and (4) growing on basic rocks and stones in or near flowing water (Erzberger 2016). This species is present in many Mediterranean countries and islands (Ros et al. 2013). In particular, it occurs in Greece, Crete, Turkey and Tunisia. After this first record in Cyprus, the species was found in six other rivers, both with perennial and intermittent regime. Therefore, the species is well established on the island.

17. ***Fissidens speluncae*** Broth.
Contributors. K. M. Manjula, C. N. Manju and B. Mufeed
India. Kerala, Malappuram district (Canoli plot, Nilambur, 50 m), 24 July 2014, *leg*. K. Manjula *s.n.* (ZGC 671A); Idukki district, on way to Munnar from Marayoor, MunnarUdumalpet road, 1168 m a.s.l., 05 February 2014, *leg*. K. Manjula *s.n.* (ZGC 996); Anamudi Shola NP, Mannavan shola, 1700 m a.s.l., 12 July 2017, *leg*. B. Mufeed *s.n.* (ZGC 7324b).

Fissidens Hedw. is represented by 62 species in India, of which 34 occur in the Eastern Himalayas, 25 in the Western Himalayas, 11 in the Gangetic Plains and 14 in central India (Lal 2005); 59 species, one subspecies and five varieties occur in the Western Ghats (Manjula, present study). *Fissidens speluncae* was originally described from Sri Lanka, and Manjula et al. (2015) reported it erroneously as *F. linearis* var. *obscurirete* (Broth. & Paris) I.G.Stone, a new record for Kerala, based on the sterile collection cited above. Here it is corrected as *F. speluncae* and is a new record for India.

Plants medium sized 2–6 × 1–2 mm wide including leaves, 7–17 pairs of alternate leaves more crowded towards tip, usually unbranched with yellowish-green stem, 0.12–0.13 mm diameter, central strand lacking; rhizoids brown, smooth; hyaline nodules absent; leaves lanceolate 0.86–1.23 × 0.22–0.29 mm, 4 times long as wide, marginal cells projecting, leaf apex acute with terminal single costal cell; limbidium on vaginant laminae, four

or five rows at vaginant laminae base, reaching the insertion; vaginant laminae open, unequal and reaching 1/2 or 2/3 of apical lamina, 0.12–0.15 mm wide at base, unistratose; dorsal lamina rounded base, dorsal and apical lamina unistratose; costa prominent, yellowish-green, slightly excurrent; laminal cells quadrate to irregularly hexagonal, pluripapillose, juxta costal cells not differentiated, apical cells ± 20 × 5 µm, mid dorsal laminal cells 7.30–8.20 × 3.99–6.66 µm, mid vaginant laminal cells 8.97–15.34 × 6.29–12.49 µm; gemmae not found.

Fertile plants dioicous, perigonia terminal, plants 2.50–3.40 mm long, perigonial leaves 0.80–0.95 mm long, antheridia 0.17–0.21 mm long; perichaetia terminal, plants 4.73–5.60 mm long, perichaetial leaves 1.16–1.44 mm long, up to 10 rows of limbidium present at base of apical lamina and vaginant laminae, archegonia 0.19–0.21 mm; sporophyte not found.

Fissidens speluncae Broth. is characterised by lanceolate leaves with an acute apex, a slightly excurrent costa, 4–6 papillae on cells of the vaginant lamina, and a prominent limbidium at the base of its perichaetial leaves. It occurs on soil and cuttings in evergreen forests and moist deciduous forest. It is sometimes found in association with *F. walkeri* Broth. and can be confused with *F. ceylonensis* Dozy & Molk., which in contrast has oblong leaves with an intramarginal limbidium.

18. ***Fissidens viridulus*** (Sw.) Wahlenb.
Contributors. K. M. Manjula and C. N. Manju
India. Karnataka, Nandhi Hills, 1400–1478 m a.s.l., 17 September 2018, *leg*. Sabhareesh *s.n.* (ZGC 4098, 4018).

Fissidens viridulus is known from the Western Himalayas in India (Gangulee 1971), and globally is reported from almost all European countries (Hodgetts 2015), Asia (Siberia, the Himalayas of Nepal and India, Japan) (Suzuki and Iwatsuki 2012), North (Ros et al. 2013) and sub-Saharan Africa (O'Shea 2006), and Australia and New Zealand. The present collection is a new record for the Western Ghats and for Karnataka state.

Bruggeman-Nannenga in Hill et al. (2006) commented that most of the North American authors treated this species as an expression of the *F. bryoides* complex (Pursell 2007).

However, *F. viridulus* in India is characterised by oblong lanceolate leaves with an obtuse to mucronate apex, a long peristome, perigonia and perichaetia in a single cluster, and limbidia only intermittently present along the leaf margins. These features separate it from the otherwise similar *F. bryoides*.

19. ***Gymnocoleopsis cylindriformis*** (Mitt.) R.M.Schust.
Contributor. M. Burghardt
Ecuador. Pichincha, Distrito Metropolitano de Quito, Volcán Pichincha, Planada del Volcàn, Quebrada Yuracyacu, 1.5 km SE of the refugio del Guagua Pichincha, 4130 m a.s.l., growing intermixed with *Campylopus* Brid. sp. in boggy páramo, 78°35′7.68″W, 0°11′10.46″S (WGS 84), 8 February 2008, *leg*. M. Burghardt, S. León-Yanez, X. Haro-Carrion & A. Moscoso *6632*, *det*. M. Burghardt (QCNE-230424).

Gymnocoleopsis cylindriformis is a rare species occurring in the high mountains of the tropical Andes, tropical Africa (Gradstein 2013), and on the subantarctic Kerguelen, Marion Island, Possession Island and Prince Edward Island (Grolle 2002). In the tropical Andes it has been reported under several synonyms (Váňa et al. 2013) from Colombia (Gradstein et al. 1983), Venezuela (Schuster 1978), Peru (Buchloh 1961) and Bolivia (Stephani 1916). The new record closes a gap in the knowledge of the tropical Andean distribution of this species. A visit to the collection site in 2016 revealed a dramatic change in the vegetation of the area: the humid, boggy páramo, characterised by the abundance of *Azorella* Lam. spp., *Breutelia* (Bruch & Schimp.) Schimp. spp., *Campylopus* spp., *Huperzia crassa* (Willd.) Rothm. and *Plantago rigida* Kunth, occupying large parts of the plain, was dried up and covered with a plantation of *Polylepis* Ruiz & Pav. sp., destroying the once species rich ecosystem and making way for the invasion of Poaceae from the surrounding grass páramo. It is unlikely that *G. cylindriformis* survived this change, but the authors' believe that a search in other humid páramos, such as the Páramo de Guamaní, about 50 km to the east, which in part lies protected within the Cayambe-Coca National Park, may reveal other populations.

20. ***Jaffueliobryum latifolium*** Thér.
Contributors. E. Z. Baisheva and M. S. Ignatov
Russia. Republic of Bashkortostan, Davlekanovskiy District, southern bank of Aslykul' Lake, 54°17′44″N, 54° 34′47″E, 270 m. a.s.l, on soil in steppe, 24 June 2016, *leg*. E. Z. Baisheva *10–4* (UFA).

This species is widespread in xeric areas of Asia, including Mongolia, China (Inner Mongolia, Xinjiang and Xizang), and southern part of Siberia (from the Altai to Transbaikalia), with scattered localities in more northern regions in Yakutia and Taimyr (Ignatov 2017). Churchill (1987) synonymised *Jaffueliobryum latifolium* with the North American *J. wrightii*, but Ignatov and Tong (1994) and Ignatov (2017) accepted the former as a species of its own, discussing their distinctions. The species was only recently discovered in the Caucasus: in Kabardino-Balkaria (Kharzinov et al. 2006), Stavropol' Region (Doroshina 2008) and Dagestan where it does not seem to be rare (Ignatov et al. 2010). This record from the Urals is the first for the European part of Russia.

21. ***Lewinskya speciosa*** (Nees) F.Lara, Garilleti & Goffinet
Contributors. Z. Komínková, V. Plášek and S.-L. Guo
China. Hebei Province: Yu County, Xiao-Wu-Tai Mt., Jin-He-Kou Scenic Area, 39°52′40.8″N, 114°56′31.0″E,

1400–1500 m a.s.l., 5 August 1997, *leg.* Jian-Cheng Zhao *s.n.*, *det*. Zuzana Komínková (HBNU 971910-6, OSTR B2727). Shaanxi Province: Mei County in the southwest of the province, Taibai Mt., vicinity of Bao-Ji town, 34°00′49″N, 107°49′26″E, 2344 m a.s.l., 12 June 2016, *leg*. Shui-Liang Guo & Ling Zhan *s.n.*, *det*. Zuzana Komínková (SHNU 20160512026, OSTR B2700).

A total of 45 species and two varieties of the broadly understood genus *Orthotrichum* Hedw. have hitherto been reported from China (Ellis, Aleffi, Alegro, et al. 2016; Ellis, Aleffi, Bednarek-Ochyra, et al. 2017; Skoupá et al. 2017, 2018). *Lewinskya speciosa* is widely distributed in China and so far it has been reported from fifteen provinces, including Chongqing, Gansu, Heilongjiang, Hubei, Hunan, Inner Mongolia, Jilin, Liaoning, Qinghai, Shanxi, Sichuan, Xinjiang, Xizang, Yunnan and Zhejiang (Skoupá et al. 2017). A recent revision of herbarium specimens resulted in discovery of this species in two additional provinces of China; Hebei and Shaanxi.

22. ***Lewinskya striata*** (Hedw.) F.Lara, Garilleti & Goffinet

Contributors. Z. Komínková, V. Plášek and S.-L. Guo

China. Shaanxi Province: Mei County in the southwest of the province, Taibai Mt., 34°00′39″N, 107°49′55″E, 2720 m a.s.l., 12 May 2016, *leg*. S.-L. Guo *s.n.*, *det*. Z. Komínková (SHNU 20160512041, OSTR B2704).

According to literature data and a revision of the specimens in Chinese herbaria, including FSHN, KUN, PE, SHNU, XJU, *Lewinskya striata* was historically recorded in ten provinces of China, including Heilongjiang, Hubei, Inner Mongolia, Jilin, Liaoning, Shanxi, Sichuan, Xinjiang, Xizang and Yunnan (Skoupá et al. 2017). This contribution presents the first record of the species in Shaanxi Province. The moss was collected from bark of tree during a bryological survey of the Taibai Mountains, growing together with *Orthotrichum consobrinum* Cardot and *O. crispifolium* Broth. and *L. speciosa* (Nees) F.Lara, Garilleti & Goffinet.

23. ***Mannia gracilis*** (F.Weber) Schill & D.G.Long

Contributor. S. Ştefănuţ

Romania. Southern Carpathians: Făgăraş Mountains, Căldarea Fundul Caprei, Argeş County, 45°36′5.93″N, 24°38′33.06″E, 2130 m a.s.l., on rocks, 25 August 2017, *leg*. S. Ştefănuţ *s.n.*, *det*. S. Ştefănuţ (BUCA *B4849, B4850*).

Mannia gracilis was collected from around the glacial area, where the snow is present for a long time. The plants grew with other liverworts such as *Asterella lindenbergiana* (Corda ex Nees) Arnell, *Bucegia romanica* Radian, *Conocephalum salebrosum* Szweyk., Buczkowska & Odrzykoski, *Marchantia polymorpha* L., *Peltolepis quadrata* (Saut.) Müll.Frib. and *Preissia quadrata* (Scop.) Nees.

This is the second report for *M. gracilis* in the mountains of Romania (Ştefănuţ 2008; Ştefănuţ and Goia 2012). The first was from the Bucegi Mountains (Ştefănuţ 2004) and is the nearest other locality for this species. The conservation status of *M. gracilis* in Romania is changed from Critically Endangered—CR B2ab(ii,iii,iv) to Endangered—EN B2ab(ii,iii,iv).

24. ***Marchantia paleacea*** Bertol.

Contributor. M. Philippe

France. Provence-Alpes-Côte-d'Azur: Alpes-de-Haute-Provence department, Saint-Paul-sur-Ubaye, 44° 36′14.01″N, 6°52′28.62″E, 2053 m a.s.l., wet gravels, 7 July 2018, *leg.* M. Philippe *s.n.* (LY22970).

This thermophilic species is new for the department and was unexpected at this altitude. It was found at the edge of gravelly seepage, fed by base-rich water, associated only with some lax and low mats of *Cratoneuron filicinum* (Hedw.) Spruce and *Ptychostomum pseudotriquetrum* (Hedw.) Holyoak & N.Pedersen. It is Red Listed for Europe (ECCB 1995).

25. ***Mesoptychia ussuriensis*** (Bakalin) L.Söderstr. & Váňa

Contributors. Yu. S. Mamontov, A. A. Vilnet and O. I. Kuznetsova

Russia. Republic of Buryatia, Tunkinsky District, East Sayan Mts, Tunkinskiy Range, valley of Kyngyrga River, 51°55′20.8″N, 102°25′34.1″E, 900 m a.s.l., *Larix sibirica* Ledeb.–*Pinus sylvestris* L.–*Betula platyphylla* Sukaczev–*Populus tremula* L. grass forest containing an understorey of *Rhododendron dauricum* L. and *Rosa* L. sp., E-facing cliffs on mountain slope, on cliff surface, 14 July 2015, *leg.* Yu. S. Mamontov *560-1-1* (MHA, KPABG).

Mesoptychia ussuriensis has been described from Primorsky Territory, Russia (Bakalin 2008), but the distribution of this species was later extended to the Republic of Korea and China (Bakalin et al. 2015). Our record extends the known distribution of this species ca. 2000 km to the north-west from more or less monsoonal humid regions in China, Republic of Korea and the Russian Far East, to the Republic of Buryatia characterised by a sharply continental climate.

Our specimen of *M. ussuriensis* agrees with the original description (Bakalin 2008) in occurring on limestone, and possessing paroecious inflorescences, shallowly bilobed leaves, absent or irregular filiform underleaves, and trigones absent in leaf cells, but differs in having 1-celled teeth in the perianth mouth, in the type specimen the teeth are 3 cells long.

The nucleotide sequence of *trn*L-F cpDNA from the tested specimen was obtained according with protocols described in Bakalin et al. (2015) and deposited into GenBank (MK111069). The *p*-distance calculation in MEGA 5.1 (Tamura et al. 2011) revealed a low level of its divergence (0.3–1.0%) from three specimens of *M. ussuriensis* collected in Guizhou Province, China, two specimens from Primorsky Territory, Russia, and one from Gangwong-do Province, Republic of Korea.

It agrees with the level of infraspecific variation occurring in the genus *Mesoptychia* (Lindb.) A.Evans.

Mesoptychia ussuriensis has a similar pattern of distribution to the calciphyllous *M. igiana* (S.Hatt.) L.Söderstr. & Váňa and *M. morrisoncola* (Horik.) L.Söderstr. & Váňa, which occur in East Asian countries (Japan, China, Taiwan) but were also found in Baikalian Siberia (Bakalin 2003; Potemkin et al. 2015).

26. ***Niphotrichum japonicum*** (Dozy & Molk.) Bedn.-Ochyra & Ochyra

Contributors. H. Bednarek-Ochyra and K.-Y. Yao

Taiwan. (1) Yilan County: Mount Nan-hu-ta Shan, 3120−3740 m a.s.l., 24 August 1968, *leg*. C.-C. Chuang *1750* (TAIE as *Racomitrium ericoides* (Brid.) Brid.); (2) same locality, 3300−3740 m a.s.l., 14 – 18 August 1983, *leg*. Ching-I Peng *83–27 & 83–29* (TAIE).

Niphotrichum japonicum is an East Asian species (Frisvoll 1983), with a single, highly isolated station on Lord Howe Island in the Tasman Sea betrween Australia and New Zealand (Vitt et al. 1993). It has optimum occurrence in Japan, while on mainland Asia it is widely distributed but scattered in the vast area ranging from the Russian Far East, including Amur, Jewish, Sakhalin Kurils and Primorye Provinces (Ignatova 2017b), through Korea and eastern China to northern Vietnam (Frisvoll 1983). In China, the species is widespread in the eastern provinces, from Heilongjiang in the north to Fujian, Jianxi, Hunan and Guizhou in the south and Yunnan in the west (Cao et al. 2003). Herein, the species is recorded for the first time from Taiwan where it is known only from a single locality in the northern part of this insular country. In contrast, a second species of the genus *Niphotrichum* Bedn.-Ochyra & Ochyra, *N. barbuloides* (Cardot) Bedn.-Ochyra & Ochyra, appears to be very frequent at higher elevations throughout the whole island (Ellis, Afonina, Andriamiarisoa, et al. 2018). Apart from these species, two other species of this genus have been reported from Taiwan, *N. canescens* (Hedw.) Bedn.-Ochyra & Ochyra (Kuo and Chiang 1987, as *Racomitrium canescens* (Hedw.) Brid. var. *epilosum* Milde) and *N. ericoides* (Brid.) Bedn.-Ochyra & Ochyra (Lai and Wang-Yang 1976, as *R. canescens* var. *ericoides* (Brid.) Hampe) but these authors failed to cite any voucher specimens and no specimens so named from Taiwan have been located in the herbaria consulted. Occurrence of these species in Taiwan is very dubious because they are exceedingly rare in Asia and their nearest localities are northern regions of China.

27. ***Nyholmiella obtusifolia*** (Brid.) Holmen & E.Warncke

Contributors. Z. Komínková, V. Plášek, S.-L. Guo and J.-Ch. Zhao

China. Hebei Province: Yu County in the east of the province, Xiao-Wu-Tai Mt., Jin-He-Kou Scenic Area, 39° 52′59.0″N, 114°57′32.9″E, 1500 m a.s.l., 5 August 1997, *leg*. J.-Ch. Zhao, *det*. J.-Ch. Zhao, *teste* Z. Komínková (HBNU 971815-Q, OSTR B2725). Shaanxi Province: in the south-west of the Province, Taibai Mountain, 34° 00′49.0″N, 107°49′26.0″E, 2344 m a.s.l., 12 May 2016, *leg*. S.-L. Guo *s.n*., *det*. Z. Komínková (SHNU 20160512027, OSTR B2701).

Nyholmiella Holmen & E.Warncke is a bi-typic genus comprising two epiphytic species, *N. obtusifolia* (Brid.) Holmen & E.Warncke and *N. gymnostoma* (Brid.) Holmen & E.Warncke. The former has been recorded from eleven provinces in China, including the Gansu, Heilongjiang, Inner Mongolia, Jiangxi, Jilin, Liaoning, Qinghai, Shandong, Sichuan, Xinjiang and Yunnan (Skoupá et al. 2017). During a revision of orthotrichalean mosses in Chinese herbaria, this species was found new to two provinces, Hebei and Shaanxi, where it was recorded at montane elevations of 1500 and 2344 m, respectively. The species grew epiphytically on tree bark together with *Orthotrichum consobrinum* Cardot and *O. crispifolium* Broth. *Nyholmiella obtusifolia* is reminiscent of other small Orthotrichaceous species, especially *Orthotrichum crenulatum* Mitt. and *O. pamiricum* Plášek & Sawicki, with which it shares the same ecological requirements (Číhal et al. 2017). However, the latter two species differ from *N. obtusifolia* in having immersed stomata and recurved leaf margins (Plášek et al. 2014; Sawicki et al. 2017).

28. ***Orthotrichum crenulatum*** Mitt.

Contributors. V. E. Fedosov and D. E. Koltysheva

Russia. Altay Republik: Kosh-Agach Distr., Chuja River Valley, ca. 800 m a.s.l., steppe community, on boulders, 16 July 1966, *leg*. L. Bardunov *s.n*. (IRK); Khakassia, Ordzhonikidze Distr., vicinity Kop'evo settlement ca. 500 m a.s.l., rock outcrops, on shaded overhanging surfaces, 30 June 1970, *leg*. A. Vasil'ev *s.n*. (IRK); Krasnoyarsky Territory, Kansk Distr., Western Sayan Mountains, upper course of Urya River, ca. 1300 m a.s.l., S-facing rocky outcrops, on rock, 30 July 1968, *leg*. L. Bardunov *s.n*. (IRK); Ak-Sug Creek valley, 1150 m a.s.l., on poplar trunk, 17 July 1968, *leg*. L. Bardunov *s.n*. (IRK); Tyva Republic, Tes-Khem Distr., vicinity of Ak-Eric settlement, Tes-Khem River valley, ca. 1000 m a.s.l., rocky outcrops, 10 August 1968, *leg*. L. Bardunov *s.n*. (IRK); Irkutsk Province, Olkhonsky Distr., vicinity of Naratey recreation camping ground, 53.02466°N, 106.85091°E, ca. 490 m a.s.l., rocky outcrops, on shaded surface of boulder, 18 September 2018, *leg*. Koltysheva & Fedosov *s.n*. (MW).

Orthotrichum crenulatum is a Central Asian species, described from west Tibet and known from Shaanxi, Xinjiang, Xizang and Inner Mongolia Provinces in China, Afghanistan, Pakistan, Georgia, NE Turkey, Kyrgyzstan, Kazakhstan, Siberia, north India (Kashmir), central India, Turkestan, with an isolated locality in Japan (Lewinsky 1992; Lewinsky-Haapasaari 1996; Schäfer-Verwimp and Gruber 2002; Lara et al. 2010;

Ellis, Akhoondi, et al. 2011; Ellis, Afonina, Asthana, et al. 2014; Suzuki 2014; Alam et al. 2015; Ellis, Agcagil, et al. 2016; Fedosov et al. 2017). In Russia, until now, it was only known to occur in xeric areas of Transbaikalia, Buryatia and Anabar Plateau, but was unknown from the western part of southern Siberia between eastern Buryatia and Kazakhstan, despite xeric landscapes suitable for this species being widespread throughout the area. Revision of specimens kept in IRK as well as our field studies in the Priolkhon'e Area have allowed us to fill this gap. These newly presented records, as well as those published by Fedosov et al. (2017), were referred to this species during the last 2–3 years, based on specimens that had previously been identified as *O. pumilum* Sw. This is a characteristic example of how the morphological concept of European species has long been mistakenly applied to Asiatic taxa. Indeed, with its small plant size, dark green colouration, rather short leaves, immersed, strongly ribbed capsules and peristome constitution, *O. crenulatum* can resemble Asian specimens of *O. pumilum*. This complex differs from *O. crenulatum* in having leaves which are never broadly obtuse, or rounded, have recurved rather than revolute leaf margins and stomata strongly covered by the subsidiary cells.

29. ***Orthotrichum urnigerum*** Myrin
Contributors. V. Plášek and M. Nobis
Kazakhstan. N part of Tian Shan mountain range, Kyrgyzian Mts., 17 km S of Kaskelen town, 2.5 km S of Izvestkovyi settlement, 43°01′51.0″N, 76°36′30.0″E, 1730 m a.s.l., on a boulder in a pasture together with *Orthotrichum anomalum* Hedw. and a sterile specimen of *Schistidium* Bruch & Schimp., 16 May 2014, *leg*. M. Nobis *s.n*., *det*. V. Plášek (OSTR B3416).

In Middle Asia, *Orthotrichum urnigerum* has so far been reported only from Kyrgystan (Lazarenko 1938; Ignatov et al. 2006; Nowak et al. 2016) and Tajikistan (Ellis, Bayliss, et al. 2014) and herein it is recorded for the first time from Kazakhstan. In Asia, the species is also known from Azerbaijan (Lyubarskaya 1986; Ignatov et al. 2006) and recently it was discovered in Xinjiang Province in the northwest of China (Ellis, Aleffi, Asthana, et al. 2014).

30. ***Oxymitra incrassata*** (Brot.) Sérgio & Sim-Sim
Contributors. A. D. Potemkin and Yu. A. Rebriev
Russia. Rostov Region: Orlovsky District, Rostovsky State Nature Reserve, Starikovsky plot, second flood plane terrace of Manych River, ca. 46.538211°N, 42.890220°E, upper part of gentle south-facing valley steppe slope with dominance of *Stipa lessingiana* Trin. & Rupr., *Festuca valesiaca* Schleich. ex Gaudin, *Agropyron desertorum* (Fisch. ex Link) Schult., *Artemisia lercheana* Weber ex Stechm. and abundant *Artemisia santonica* L., *Galatella villosa* (L.) Rchb., *Iris pumila* L., *Limonium gmelinii* (Willd.) Kuntze, in sweating wet stria probably drying in summer, on chestnut, somewhat saline, soil; plants with androecia, 26 April 2017, *leg*. Yu. Rebriev *s.n.* (LE).

This is the first record of the genus *Oxymitra* Bisch. ex Lindenb. for Russia and the easternmost record for Europe. *Oxymitra incrassata* is a rather widespread but rare temperate liverwort occurring in the Mediterranean Basin, central and eastern Europe, Canary Islands, southern Arabian Peninsula, central South America (Uruguay, Paraguay, northern Argentina, Brazil), central México and south central USA (Vianna 1976; Campos-Sandoval and Campos-Sandoval 2017; Gradstein 2017; World Flora Online 2018). It is Vulnerable in Europe and a candidate for a new European Red List (Schumacker and Váňa 2005; Maslovsky 2017). It was recorded from 12 squares in Ukraine (Zerov 1964; Maslovsky 2017) and mentioned as a provisional species for Russia by Potemkin and Sofronova (2009) on the basis of its records from adjacent territories of Ukraine and Mongolia. This species was recorded once for Mongolia by Schubert et al. (1977), listed on the basis of a report by Abramova and Abramov (1983) and has not been found there since.

31. ***Pohlia beringiensis*** A.J.Shaw
Contributors. I. V. Czernyadjeva and S. S. Kholod
Russia. Franz Josef Land Archipelago: Jackson Island, Bystrova Cape, 81°19′50″N, 55°40′50″E, moss community with *Aulacomnium turgidum* (Wahlenb.) Schwägr., 4 August 2012, *leg*. S. S. Kholod, *# 21* (LE); La Roncier Island, 80°58′29.2″N, 60°00′23.3″E, moss-liverwort community in the crevices between the polygons, 7 September 2012, *leg*. S. S. Kholod, *# 116* (LE).

This is one of the northernmost records of *Pohlia beringiensis* and one of the few in Europe. The species has mostly an Arctic North American-Asian distribution. *Pohlia beringiensis* was described by Shaw (1982) from Alaska and was reported for Yukon (Shaw 2014); it was recently identified on Prince Oscar Land, Svalbard (Belkina and Likhachev 2013). In the Asian part of Russia *P. beringiensis* is known from the Arctic and Subarctic zone of Yamal and Taimyr Peninsulas, Anabar Plateau, Severnaya Zemlya, Yakutia, Magadan Province, Komandor Islands, Chukotka, Vrangel Island and mountain regions of south Siberia (Altai, Kodar Range in Zabaikalsky Territory) (Fedosov et al. 2011; Afonina et al. 2017; Czernyadjeva 2018). In the European part of Russia there were two finds in the Nenets Autonomous district: Bolshezemelskaya tundra and Vaygach Island (Afonina 2006). Records of *P. beringiensis* for the Murmansk and Amur regions, Khabarovsk and Primorye territories in the 'Moss Flora of Russia' (Czernyadjeva 2018) resulted from misprinting.

Pohlia beringiensis is characterised by cherry red bulbiform single axillary gemmae and cherry red stems contrasting with whitish leaves. It is similar to *P. drummondii* in shape and size of gemmae, but is

distinguished by the colour of the buds and stems (wine red vs. blackish), and also by pale whitish leaves vs. green. Shaw (1982) writes that *P. drummondii* grows on relatively organic-rich soil, whereas *P. beringiensis* prefers organic-poor sites. In Russia, differences in habitats of these two species were not found. *Pohlia beringiensis* grows on rocky outcrops, in crevices and bare soil in tundra, on mountain slopes, along brook banks on soils with varying organic content.

32. ***Rhynchostegiella pseudolitorea*** Hedenäs & J.Patiño

Contributor. R. D. Porley

Portugal. Algarve, Barranco do Lajeado, north of Caldas de Monchique, Serra de Monchique, 302 m a.s.l., 37°17′21.90′′N, 8°33′07.31′′W, on syenite rock in stream in shaded barranco, with sporophytes, 20 May 2016, *coll*. R. D. Porley, *det*. L. Hedenäs, *conf*. G. Dirske (Hb. Porley).

The genus *Rhynchostegiella* (Schimp.) Limpr. is widespread and locally frequent in and alongside streams in shady valleys (barrancos) on Serra de Monchique, with *R. curviseta* being the most common species. However, several collections of *Rhynchostegiella* were proving problematical to identify with confidence, and a number of duplicates were sent to Lars Hedenäs for his opinion. Most were referable to the recently delimitated *R. tubulosa* (see this note) but one collection appeared to match *R. pseudolitorea*, another recently delimitated species (Patiño et al. 2017). The material was subsequently examined by Gerard Dirkse and he confirmed the identification, remarking that it does not differ from what was once called *R. litorea* in the Canary Islands, having the same habit, leaf shape and spore size.

Rhynchostegiella pseudolitorea differs from *R. tenella* by a costa ending well below the apex and a rough seta, and from *R. litorea* by spore size 10–14 µm (as opposed to 11.0–22.0 µm in *R. litorea*). However, the morphological differences between *R. pseudolitorea* and *R. litorea* are subtle and consistent separation is probably not attainable; only sequencing of suitable parts of the genome would achieve that (*pers. comm*. Dirkse). Until now, *R. pseudolitorea* was not known outside Macaronesia (Canary Islands and Madeira) (op. cite.), and its occurrence on Serra de Monchique, a massif in the extreme SW of Europe and close to the Atlantic Ocean, underlines the possible connection with the Macaronesian bryoflora.

33. ***Rhynchostegiella tubulosa*** Hedenäs & J.Patiño

Contributor. R. D. Porley

Portugal. Algarve, Cortês, near Caldas de Monchique, Serra de Monchique, 300 m a.s.l., 37°17′13.57′′N, 8° 33′51.56′′W, on rock in a shady location by a small stream, with sporophytes, 22 December 2016, *leg*. R. D. Porley *conf*. L. Hedenäs (Hb. Porley).

In the course of sampling *Rhynchostegiella* (Schimp.) Limpr. across the Serra de Monchique, many collections clearly did not conform to the traditional treatments of the genus. The plants exhibited longly acuminate leaves with relatively short laminal cells and a costa ending well below the apex and the seta appeared to be smooth. Sometime later a paper was published that employed molecular species delimitation methods applied to *Rhynchostegiella* (Patiño et al. 2017). The Serra de Monchique material seemed to match the description of the recently delimitated *R. tubulosa*, which has leaves characterised by, especially when dry, strongly incurved margins giving the appearance in the upper part of the leaf of being tubular. A number of collections were subsequently confirmed by Lars Hedenäs.

Rhynchostegiella tubulosa appears to be widespread on Serra de Monchique (currently known from 18 localities) in suitable habitats e.g. on rocks alongside shady streambanks, in humid *Rhododendron* ravines, on rocks and stone walls in shady woodland distant from water. Sporophytes are frequent.

Hitherto *R. tubulosa* was considered an Aegean-Cypriotic endemic, although it was acknowledged that a thorough revision of herbarium material and field investigation in the eastern Mediterranean was needed for a definitive assessment of its distribution. This is the first report of *R. tubulosa* for Portugal and the western Mediterranean.

34. ***Schistidium platyphyllum*** (Mitt.) H.Perss.

Contributors. W. K. Hofbauer and M. Kurzthaler

Austria. Eastern Tyrol, St. Jakob in Defereggen, Defereggen valley, near the track from Guesthouse Oberhaus to Jagdhaus, 46°56′39.1′′N 12°13′08.5′′E; ca. 1770m a.s.l., growing on siliceous rock (schist) in a river (Schwarzach river), 15th July 2017; *leg*. / *det*. W.K. Hofbauer *s.n.* (E).

This is the first unambiguous record of *Schistidium platyphyllum* for Eastern Tyrol, Austria. It was collected during a biodiversity day survey (Tag der Artenvielfalt) organised by Martin Kurzthaler, of the administration of the National Park Hohe Tauern. Small cushions were situated on the flat upper surface and margins of big boulders above running water, but inundated during high water, and therefore silt accumulated in the cushions. It sometimes formed pure stands, or was accompanied by *S. rivulare* (Brid.) Podp., which was quite distinct because it was looser with longer branches. In older treatments *S. platyphyllum* has been mentioned for Austria, but because of nomenclatural uncertainties (see Blom 1998; Kiebacher and Köckinger 2015) and because former authors often did not distinguish between *S. platyphyllum* and *S. sordidum* I.Hagen, all historical records are doubtful

(Grims 1999). This is the case for the records in Düll (1991), Northern Tyrol up to 2306 m a.s.l., Hochvogel, and Eastern Tyrol 2800 m a.s.l., Bergertörl, who synonymised *S. platyphyllum* with *S. sordidum*. Recently *S. platyphyllum* has been recorded for several Austrian states: Vorarlberg (Amann et al. 2013; Schröck et al. 2013), Lower Austria (Zechmeister 2012) and Upper Austria (Dort van and Smulders 2010). In Central Europe there is a somewhat disjunct distribution with some records in the Alps at considerable height, but a few records in rivers e.g. in the flat lowland in northern Germany (Meinunger and Schröder 2007). Apart from Europe the species is widespread in mountainous regions almost worldwide (Faubert and Gagnon 2016).

35. ***Solmsiella biseriata*** (Austin) Steere
Contributors. P. Srivastava, V. Sahu and A. K. Asthana
India. Manipur, Imphal, Bishnupur, Leimaram, near Sadu Chiru Falls, 24°44′21.3″N, 093°44′56.3″E, 1111 m a.s.l., epiphytic, 28 July 2018, *leg*. Priyanshu Srivastava *s.n.* (LWG 307248D).

Solmsiella biseriata in the family Erpodiaceae, has recently been identified from Manipur, north-eastern India, and is new to the Eastern Himalayas. It was earlier reported from the Western Ghats (Daniels et al. 2012) and Eastern Ghats (Asthana and Srivastava 2016). Only one species of *Solmsiella* is reported from India. The plants were bright green, small, with irregularly branched shoots, 4–6 mm long, appressed to bark. Leaves were widely spreading, contiguous, complanate and ecostate with entire margins, arranged in two dorsal and two ventral rows. The dorsal leaves were oblong-ovate with the margin incurved at the base, while the ventral leaves were ligulate with an obtuse apex.

36. ***Sphagnum fuscum*** (Schimp.) H.Klinggr. s.str.
Contributors. D. A. Philippov
Russian Federation. Republic of North Ossetia-Alania: Irafsky District, Digora gorge, valley of the Kharesidon river, 12 km to WNW from the village of Stur-Digora, National park 'Alania', Chifandzar mire, 42°55′08.1″N, 43°30′48.0″E, ca. 2280 m a.s.l., open sedge-*Sphagnum* mire in the river valley, hummocks, with *Carex rostrata* Stokes, *Nardus stricta* L., *Polytrichum strictum* Brid., very rare, 18 September 2018, *leg*. D.A. Philippov *18–1260* (IBIW, LE).

This is the first record of *Sphagnum fuscum* for North Ossetia. This species was not reported for the North Caucasus region in the checklist of Sphagnophyta of Europe and Macaronesia (Séneca and Söderström 2009). The species is also not mentioned in the latest report on *Sphagnum* mosses of North Ossetia (Doroshina and Nikolajev 2018).

In general, *S. fuscum* s.str. is a fairly widespread species (Kyrkjeeide et al. 2015), reported from most European countries, European Russia, temperate Asia (Siberia, Russian Far East, Middle Asia, China, Mongolia, and Japan) and North America (Canada and USA), but it is known to be very rare in mountain areas (Ignatov et al. 2006; Séneca and Söderström 2009; Kyrkjeeide et al. 2015). In the Caucasus Mountains, the species is reported from Armenia (Manakyan 1995), Georgia (Chikovani and Svanidze 2004), and Russia, namely: one record from Karachay-Cherkess Republic (Sofronova et al. 2012) and six records from Elbrussky and Chereksky Districts of Kabardino-Balkar Republic (Tarnogradsky 1959; Sofronova et al. 2012, 2018; Philippov, not publ.).

37. ***Sphagnum medium*** Limpr.
Contributors. H. Kürschner, M. Kırmacı & A. Erdağ
Turkey. Province Trabzon: Soğanlı Dağ, south of Sürmene-Köprübaşı, Ağaçbaşı Yayla near crossing to Yangin Yayla, 40°41′41.5″N, 40°04′59.6″E, 1980 m a.s.l., peat bog, 17 July 2012, leg. M. Kırmacı & H. Kürschner (MKIR 6121) [reported as *S. magellanicum* Brid. by Kırmacı and Kürschner (2013)]; south of Sürmene-Köprübaşı, Ağaçbaşı Yayla Ayı Yatağı locality, 25 August 2016, *leg*. M. Kırmacı (MKIR 7265). All specimens at (AYDN).

Owing to dry summers, arid climatic conditions in most parts of the country, and the rarity of ombrogenic raised peatbogs, *Sphagnum* L. is the rarest bryophyte in Turkey. A first overview of the taxa and suitable sites in Turkey was given by Kırmacı and Kürschner (2013), who recorded among others, *S. magellanicum* from three localities in the Black Sea region. The recently published study of the relationships of the *S. magellanicum* complex by Hassel et al. (2018) has shown that *S. magellancum* is restricted to South America and not present in Europe and the Old World. Instead, two species are hidden in this complex, *S. medium* Limpr. and *S. divinum* Flatberg & Hassel, both widespread in Europe, the latter with a slight southern trend. The re-assessed study of the three Turkish records and further collections between 2016 and 2017 have shown that both taxa occur in Turkey. *Sphagnum divinum* is most frequent, *S. medium* is rarer. The characters of the Turkish samples fully match those given for the taxa by Hassel et al. (2018) and Laine et al. (2018).

As in Europe, *S. medium* in Turkey is mostly restricted to sunny, exposed and elevated hummocks of open, mainly treeless ombrotrophic mires. The two new Turkish records close the distribution gap between the European-Mediterranean stands and those from the Caucasus (Georgia).

38. ***Symphyogyna brasiliensis*** Nees
Contributors. G. M. Suárez and J. R. Flores
Argentina. Tucumán: Departamento Trancas, San Pedro de Colalao, 26°13′03″S, 65°34′18″W, 1560 m a.s.l., llegando al Puente del Indio, 2 November 2018, *leg*. G. Suárez & J. Campi *1815* (LIL).

The simple thalloid liverwort species, *Symphyogyna brasiliensis* is considered the most common Neotropical member of the genus (Gradstein et al. 2001). This report for the Argentinean forest is a more austral record for this species in the Andean region. In Argentina, *S. brasiliensis* was found in the Chaqueño Serrano forest in an intervalley area with patches of Yungas element, growing on moist rock beside a shaded damp streambank.

Although it shows strong morphological variation, its procumbent habit, the entire margins of the thallus with marginal cells square to rectangular, are diagnostic characters in this species (Uribe and Aguirre 1995).

39. ***Syrrhopodon tristichus*** Nees ex Schwägr.
Contributor: L. T. Ellis
Singapore: Nee Soon Swamp, 26 February 2016, *leg.* B. C. Ho *16-022* (SING 0233427).

Syrrhopodon tristichus, in the family Calymperaceae, is a tropical forest epiphyte with an Indo-Pacific distribution. There are reliable records of its presence from Sri Lanka, eastward across Malesia, Australia (Queensland) and Oceania as far as the Society Islands. It is known from both lowland and montane forest, up to 1800 m a.s.l. The species is generally well known in the Malay Peninsula, but hitherto not recorded for Singapore. The voucher collection was epiphytic in lowland swamp forest, and consisted of only a few poorly developed shoots.

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ORCID

A. D. Potemkin http://orcid.org/0000-0003-4420-1704

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